Workshop: 2nd ESA Workshop on Tracking, Telemetry, and Command Systems for Space Applications

Topic: Spacecraft Tracking

Title: New Tracking Implementation in the Deep Space Network

Authors: Jeff B. Berner (JPL), Scott H. Bryant (JPL)

Addresses:

Jeff B. Berner
JPL, MS 238-737
4800 Oak Grove Dr.
Pasadena, CA 91109
USA
818-354-3934
jeff.b.berner@jpl.nasa.gov

Scott H. Bryant
JPL, MS 238-737
4800 Oak Grove Dr.
Pasadena, CA 91109
USA
818-354-5979
scott.h.bryant@jpl.nasa.gov

Contact: Jeff B. Berner

As part of the Network Simplification Project (NSP), the tracking system of the Deep Space Network (DSN) is being upgraded. This upgrade replaces the discrete logic sequential ranging system with a system that is based on commercial Digital Signal Processor (DSP) boards. The new implementation allows both sequential and pseudo-noise types of ranging.

The other major change is a modernization of the data formatting. Previously, there were several types of interfaces, delivering both intermediate data and processed data (called "observables"). All of these interfaces were bit-packed blocks, which did not allow for easy expansion, and many of these interfaces required knowledge of the specific hardware implementations. The new interface supports three classes of data: raw (direct from the measuring equipment), derived (the observable data), and filtered (data whose values depend on multiple measurements). All of the measurements are reported at the sky frequency or phase level, so that no knowledge of the actual hardware is required. Also, the data is formatted into Standard Formatted Data Units, as defined by the Consultative Committee for Space Data Systems (CCSDS), so that expansion and cross-center usage is greatly enhanced.